THE AUSTRALIAN PLANT DISEASE RECORDER.

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Edited by:

K.E. Hutton, Biological Branch,
Department of Agriculture,
Box 36, G.P.O., Sydney.

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For private circulation to plant pathologists within Australia.

COMMONWEALTH MYCOLOGICAL INSTITUTE
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PLANT DISEASE NOTES.

FIELD AND FODDER CROPS.

DISEASE OF SUBTERRANEAN CLOVER:

Over the past two months, a serious disease of subterranean clover has been reported over the south-eastern portion of New South Wales. The first specimens seen came from the South Coast in mid-June, but the disease had probably been present then for some weeks. Since this first record, the disease has been reported from many areas in southern N.S.W., the main areas concerned being around Wagga Wagga, Cootamundra, Harden, Young, Temora and Albury. In some cases only about ten per cent. of plants in the pasture have been affected but several reports of seventy to eighty per cent of affected plants have been received.

The diseased plants are stunted in growth and show a marked reduction in size of the central leaves. These leaves have small blades, with chlorotic margins and are somewhat wavy in appearance. The outer leaves often show a pronounced red colouration and many die off.

So far, it has not been possible to determine the cause of this disease. On symptoms, it resembles in some respects both a nutritional disorder and a virus disease. Its wide distribution and its occurrence on soils of many types makes a nutritional cause seem rather unlikely and investigations are being concentrated mainly on the possibility of virus infection.

Several virus diseases of clovers have been reported. Bean yellow mosaic and pea mosaic would appear to be the two main ones on subterranean clover in Australia. Bean yellow mosaic causes a mosaic pattern on the leaves and severe stunting often occurs (H.L. Harvey, A.P.D.R. 6: 3: 34, 1954). It is aphid transmitted and H.L. Harvey (A.P.D.R. 7: 2: 18, 1955) considers that, from field evidence in Western Australia, the disease could be severe in a season of high vector activity.

Pea mosaic causes stunting of subterranean clover, the leaves often being small, chlorotic, misshapen and slightly mottled (D. Goodchild and Barbara Carne, A.P.D.R. 7: 1: 1, 1955). Plants may remain alive for many weeks but eventually die. Symptom expression varies with variety.

Results of current investigations will be reported later.

Department of Agriculture,
Sydney.

- J. WALKER.

VEGETABLES.

LATE BLIGHT OF TOMATOES:

During June and early July, 1955, serious losses of tomato seedlings occurred in the Sydney Metropolitan Area as the result of attack by Phytophthora infestans. Reports were received only from the northern suburbs though it is possible that the disease occurred elsewhere. In one nursery which produces plants for distribution to commercial growers all of 120,000 seedlings were affected.

Factors which possibly contributed to the outbreak of the disease include (1) the prevalence of rainy periods and cool nights in May and early June, (2) a widespread, though not serious, occurrence of late blight in the 1954-55 potato crops and (3) the inadequate spraying programmes applied to tomato seedlings by most nurserymen.

- W.S. SUTTON.

Department of Agriculture,
Sydney.

EARLY BLIGHT OF POTATO:

Conditions for early blight infection were particularly favourable in the Central Tablelands of New South Wales during the past season and enabled an assessment of the field reaction of a number of varieties to be made during the second certification inspection. Crops of the variety Crana were severely affected, some cases of almost complete defoliation of plants being observed. Light to moderate infection had occurred on the varieties Adina, Awaba, Exton, Katahdin, Monak and Sebago and very light infection on Aussie, Menominee, Ontario, Saranac and Sequoia. Walanga, a very late maturing variety, was not affected at the time of inspection.

The susceptibility of Crana to this disease was also observed in other localities. In the Crookwell section of the Southern Tablelands, where relatively dry conditions had prevailed early in the season, slight infection was observed on Crana and none on any other variety. In the Batlow-Tumbarumba area, where moist conditions had been experienced in February and March, the district agronomist reported that "early blight was most noticeable on the variety Crana which was particularly susceptible to the disease, while most other varieties showed some degree of susceptibility." He further stated that light infection had occurred on Walanga.

- R.J. CONROY.

Department of Agriculture,
Sydney.

CONTROL OF DOWNY MILDEW OF ONIONS:

Downy mildew of onions (Peronospora destructor) occurs each year in market gardens adjacent to Perth, in spring and early summer crops.

A statistically designed spray experiment was carried out in the Spearwood district during the 1954-55 season to compare seven fungicides for mildew control.

Two proprietary spreaders, Agral LN and Triton B-1956 both used at the rate of 6 fl. oz. in 100 gallons of water, were tested separately with each material (except lime sulphur-resin soap) because the fungicides as formulated did not wet the onion foliage adequately.

Five spray applications were made at approximately 10 day intervals, commencing three weeks after planting out from the seed-bed.

All plots were harvested at maturity and the onions were cured for a fortnight before being topped, graded and weighed.

The following table lists the total yields in lbs. for the various treatments:-

Treatment		Strength of Spray	Yield of Cured Onions in lbs. (Av. of 3 plots.)
1. Control		unsprayed	51.33
2. Copper oxychloride	+ Agral-LN	3 1/3 lb.-100 gal.	50.66
3. "	+ Triton B1956	"	53
4. Thiram	+ Agral	1½ lb.-100 gal.	44
5. "	+ Triton	"	48
6. Ziram	+ Agral	"	52
7. "	+ Triton	"	57.33
8. Zineb	+ Agral	"	62.33
9. "	+ Triton	"	65
10. TZU-4311 (a)	+ Agral	"	45
11. "	+ Triton	"	55.33
12. Captan	+ Agral	2 lb.-100 gal.	53.33
13. "	+ Triton	"	49.33
14. Lime sulphur-resin soap (b)		1% of each	50.66
	Difference for significance	5%	8.72
	" " "	1%	11.78

(a) An experimental fungicide supplied by Henry York & Co., Melbourne, having the composition 40% thiram, 20% ziram, 20% tetramethyl dithiocarbamine acid methyl arsine, remainder inert material.

(b) Prepared according to Yarwood's formula (Hilgardia. Vol 14, No. 11 Feb. 1943).

Of all the sprays tested, only zineb gave significantly higher yields than the control.

TZU-4311 was better with Triton than with Agral (0.05 level) but there was no significant difference between spreaders with the other fungicides. Both spreaders proved satisfactory with each spray.

During the early stages of crop growth, mildew developed rapidly in all plots but damage was noticeably less in those sprayed with zineb. However, treatment differences were much less obvious at maturity owing to the advent of weather conditions unfavourable for mildew development.

From the results of this experiment, it is suggested that where downy mildew is troublesome on onions, a zineb spray is well worthy of trial both for field crops and onions grown for seed.

Further tests are planned with this material for the coming season.

- R.F. DOEPEL.

Department of Agriculture,
Perth.

STEM ROT OF CUCUMBER.

Specimens of cucumber plants (var. Crystal Apple) received from Lower Portland, N.S.W., in the autumn of this year were affected with a stem rot. A species of *Fusarium* was isolated and the disease was reproduced when plants were grown in the glasshouse in pots of sterilized soil artificially infested with the organism. Plants in control pots remained healthy. The organism is not at present considered to be *F. solani* (Mart.) Sacc. f. *cucurbitae* Snyd. & Hans. and further work is planned on the identification of the pathogen and on varietal susceptibility.

- R.J. CONROY.

Department of Agriculture,
Sydney.

FRUIT.

CITRUS LOSSES IN N.S.W.

Exceptionally wet weather along the N.S.W. coast from January to June, 1955, has caused considerable waterlogging in citrus orchards in the Central Coast and in the Windsor and Hills districts. This has resulted in a marked increase in Phytophthora root rot activity, particularly in mature to old trees, and many trees which survived the 1949-52 wet years will probably succumb in the coming season. An estimate has been made by the district Fruit Officer that approximately 400,000 citrus trees in the Gosford-Wyong area of the Central Coast are uneconomic due to root rot. In the Windsor and Wiseman's Ferry areas on the Hawkesbury River, where some minor flooding occurred, an estimated 80,000 trees will be lost in addition to those killed out in 1949-52.

- LILLIAN R. FRASER

and

Department of Agriculture, Sydney.

T.B. KIELY.

ROOT ROT OF STONE FRUIT TREES:

The prolonged rain period from January to June, 1955, again provided waterlogged soil conditions in the Metropolitan Area favourable for invasion of peach roots by *Phytophthora cinnamomi* Rands. In one Sydney nursery some 30,000 peach trees, which were to be sold this winter, were destroyed and the loss over all Metropolitan nurseries was estimated at approximately 60,000 trees.

Since first isolated from the roots of a yearling peach seedling by Dr. L.R. Fraser in March, 1948, *Phytophthora cinnamomi* has been found to have invaded the roots and crown of seedling peach stocks and trees in the above nurseries whenever conditions of prolonged waterlogging have occurred during the summer and early autumn. Under extremely favourable conditions losses are of the above magnitude and of that reported previously (A.P.D.R. 1: 4: 56, 1949).

P. cinnamomi has been isolated also from a canker on a branch of a three years old Red Becky peach tree. The canker commenced just below soil level, progressed up the trunk and onto the limb to a height about eighteen inches above soil level. This condition, locally designated peach trunk canker, frequently involves the roots also. Such trees often die within about four years of planting out in the orchard and most likely were initially infected in the nursery. The fungus has also been isolated from the roots of young apricot trees and from Myrobolan plum. Field observations suggest that Mariana plum has a degree of resistance.

The pathogenicity of P. cinnamomi to peach seedlings was demonstrated in December, 1951, when it was introduced, on lengths of lucerne stem, to the sterilized soil in "Four-inch" pots in which three months old Pullar's Cling peach seedlings were growing. In a series of twelve such seedlings, subjected to continuous waterlogging immediately after the fungus was introduced to the soil, the plants were severely wilted within nine days; the basal leaves were yellow, the root fibre had been destroyed, the main roots were uniformly rotting, the bark at the base of the stem had rotted to one inch above soil level and the wood was stained brown for four inches above soil level. P. cinnamomi was re-isolated from the roots of the diseased plants. In a similarly flooded series, to which sterile pieces of lucerne stem had been introduced, the only abnormality observed at that time was a browning of the tips of some of the roots. No symptoms of disease could be detected in either of two similar series held at normal moisture levels.

- K.E. HUTTON.

Department of Agriculture,
Sydney.

GLOEOSPORIUM INFECTION OF APPLE TWIGS:

For some years specimens of canker and dieback from pruning wounds on apple trees have occasionally been submitted to this laboratory, but, until recently, no progress was made in identifying the disease. Fruiting bodies could not be found and isolations from the wood were inconclusive.

During the autumn of 1955, an orchard was visited where a large percentage of fruit spurs and laterals were cankered or dying back. Acervuli of Gloeosporium sp. were associated with the cankers. The variety most severely affected was Geeveston Fanny. Other varieties involved include Jonathan, Democrat, Sturmer, Crofton, Tasman's Pride and Granny Smith. The degree of infection on each tree was uniform over the length of the limbs. On Geeveston Fanny 70% of twigs were infected and on a sample of 81 such twigs 107 separate infections were counted. On Jonathan and Democrat, about 30% of the twigs were infected. Over 85% of infections were traced to pruning wounds, and woolly aphid injury and miscellaneous wounds accounted for the rest. Infection was more common on fruiting spurs than on laterals, and frequently resulted in the death or weakening of the fruit buds. A considerable reduction in yield will probably follow this infection, particularly on Geeveston Fanny.

In a neighbouring orchard heavy infection occurred on Sturmers in the winter of 1953. The 1952-53 season had been very favourable for Gloeosporium development on apples, and fruit left in the orchard became extensively rotted. This probably provided a heavy inoculum for twig infection during pruning, for a species of Gloeosporium similar to that now observed on twigs has been found on fruit in orchards during the winter and is one cause of target rot.

Acervuli on the twigs are white when young, but, on breaking through the epidermis, soon become black. They do not occur in large numbers, and have not yet been found in cankers over two years old. Conidia are hyaline, single celled, straight, tending to be ellipsoidal, borne singly at the tips of conidiophores and measuring 6.4 to 14.2 by 1.9 to 3.5m. In culture on P.D.A. the spores show considerable variation, micro-conidia occurring in large numbers. Spore measurements were 3.7 to 14.9 by 1.1 to 4.3m. and there was a greater tendency for the spores to be ellipsoidal. Wilkinson (Trans. Brit. Mycol. Soc. 28: 77-85, 1945) gives spore measurements for Gloeosporium perennans (Zeller and Childs)

as 4.5 to 18 by 2.2 to 6m, so that the Gloeosporium sp. in Tasmania more or less agrees with the description for G. perennans. However, Wilkinson quotes Zeller and Childs' spore measurements as 12 to 20 by 4 to 6m.

An acervulus of the G. perennans type was placed in a 0.1% sucrose solution. After two days considerable germination had taken place and many hyphae had branched several times. Many had reached lengths greater than 1 mm. At the end of three days, micro-conidia had developed on some of the hyphae. This is in keeping with Wilkinson's details of the behaviour of G. perennans.

An acervulus with hyaline, non-septate, curved spores measuring 13 to 17.7 by 2.1 to 3.5m, was found on one canker. These spores correspond very closely to G. album, which causes ripe spot of the fruit. This is interesting because G. album, according to Wilkinson, does not attack apple wood. However, G.C. Wade has demonstrated that this species is capable of infecting apple twigs. Further inoculations are being made this spring.

Inoculations of acervuli from apple twigs and from a culture of G. album were made into Cleopatra apples. Both inocula caused rotting of the apples. The acervuli produced, following inoculation from twig material, were grey-buff coloured, with spores the same as those developed on twigs.

- J.R. WARD.

Department of Agriculture,
Hobart.

TRANSFER OF CUCUMBER MOSAIC VIRUS TO PASSIONFRUIT:

During 1940 a study was made of the woodiness disease of passionfruit in the field and glasshouse. It was observed that in the autumn and winter months of that year a yellow spot symptom which was similar to one previously observed on passionfruit inoculated with the virus of banana infectious chlorosis (cucumber mosaic virus. J. Aust. Inst. Agric. Sci. 6: 44-47. 1940) was present in most passionfruit vines in the Gosford district. This raised the question whether the woodiness disease was merely another manifestation of the presence of cucumber mosaic virus rather than a disease caused by a specific Passiflora virus. A series of isolations was then made from passionfruit vines affected with woodiness and all isolates were classed as cucumber mosaic virus. Further work on the disease was interrupted by the war.

During the last year or two several isolates have again been obtained from woody vines and have been propagated on a number of differential hosts. These isolates also have all been classed as cucumber mosaic virus. In spite of numerous attempts, however, none of these could be transferred mechanicall back to passionfruit. (In 1940 this had been done with the aid of Aphis gossypii). Reference was made to this difficulty during Session 6(n) of the recent Plant Diseases Conference. Since then, however, an isolate of cucumber mosaic virus, obtained from marrow naturally infected at Castle Hill, has been transferred mechanically from cucumber to two of ten inoculated passionfruit seedlings, with a display of symptoms considered to be those accepted as associated with the woodiness disease. The infected seedlings will be grown on in the glasshouse in an endeavour to reproduce the woody fruit symptoms.

- C.J. MAGEE.

Department of Agriculture,
Sydney.

ORNAMENTALS.

NASTURTIUM MOSAIC:

A mosaic disease was observed recently in a large area of nasturtium (Tropaeolum majus) growing at Palm Beach, N.S.W. This disease was first recorded in N.S.W. in 1935 by Dr. H.J. Hynes but was not described fully until 1950 by Jensen in California (Phytopathology 40: 967, 1950). The virus, which seems to be widespread here and overseas, has been transferred from nasturtium to nasturtium only.

- VINLEIGH JOHNSON.

Department of Agriculture,
Sydney.

MISCELLANEOUS PLANTS.

GLOEOSPORIUM SP. ON EUCALYPTUS MACULATA:

Blight of the shoot tips and leaves was observed on young seedlings of Eucalyptus maculata in the glasshouse during a cold spell in May, 1955.

Distortion was considerable in the young leaf and shoot tissues, in the infected zones. Scattered irregular necrotic areas appeared, over which a greyish white waxy bloom developed, due to the converging of masses of individual minute erumpent conidial pustules, each about 1/3 to 1/2 m.m. in diameter.

The incitant was identified as Gloeosporium sp. and has previously been recorded on Eucalyptus spp. by several investigators, although no record of its occurrence on E. maculata could be found.

Further investigations as to the nature of the infection are being carried out.

- JILL A. WHITEHOUSE.

Faculty of Agriculture,
University of Sydney.

MISCELLANEOUS NOTES.

AMPHICHAETA GREVILLEAE IN N.S.W:

A disease of seedling Grevillea banksiae reported from a Sydney metropolitan garden has been found to be due to Amphichaeta grevilleae Loos. The symptoms, leaf blotching and defoliation, are similar to those described by Loos on Grevillea robusta seedlings in Ceylon (Trans. Brit. Mycol. Soc. 33: 40-42, 1950). The disease has also been seen several times on seedling G. robusta in N.S.W.

Only five species of Amphichaeta appear to have been described and, of these, four occur only in Australia, on native plants. Grevillea robusta, which is grown in Ceylon as a shade crop, is also an Australian species and it seems possible that A. grevilleae may also be of Australian origin, exported with its host.

- LILIAN R. FRASER.

Department of Agriculture,
Sydney.

WANTED - PERITHECIAL STAGE OF ERYSIPHE GRAMINIS HORDEI ON BARLEY:

Detached leaves bearing the perfect stage of the powdery mildew of barley are requested from any source within Australia, for research purposes.

It would be appreciated if details could be supplied concerning the variety, approximate date of sowing, age of plant at infection (in weeks), age of plant when harvested or sampled, and the approximate environmental conditions associated with the development of the perithecia (light, temperature, humidity).

Please forward samples to the author, at the address below.

- JILL A. WHITEHOUSE.

Faculty of Agriculture,
University of Sydney.

ERROR IN PAGINATION - A.P.D.R. VOL. 7, NO. 2, 1955:

An error in pagination occurred in the above number, which covered pages 17 to 25 not 1 to 9 as indicated. In order to facilitate future reference to this volume, it is suggested that these pages be renumbered.

- EDITOR.

COMMONWEALTH MYCOLOGICAL INSTITUTE NOTES.

OPENING OF NEW C.M.I. BUILDING:

On July 13th the Duke of Edinburgh officially opened the new building, which has been constructed over the past 18 months to house the Commonwealth Mycological Institute, London. As part of the Commonwealth Agricultural Bureaux organisation, the C.M.I. is the centre to which plant pathologists throughout the British Commonwealth turn for guidance in taxonomic micology and for many other services. The arrangements which governs these services is an official one and Australia contributes to the maintenance of C.M.I. according to a formula and rate decided upon at each C.A.B. Review Conference. Also at such Conferences Australia has an opportunity to influence the nature of services and general policy.

The new building is a concrete, steel and brick structure on the bank of the Thames and on the opposite side of Ferry Lane to the old building. It consists of three storeys and a basement. The basement will house the new micro-film unit and will also provide for general storage. On the ground floor is the Director's office and the library, which has a floor space of 50 ft. x 40 ft. Practically the whole of the second floor is taken up with the herbarium (55 ft. x 40 ft.) with space for nine mycologists as well as assistants. The top floor houses the Commonwealth type culture collection with bench space for nine, and laboratory accommodation for nine visitors is also provided. It is C.M.I. policy to encourage mycologists to visit the Institute to engage in special research projects.

C.P. NEWS:

In most Commonwealth countries it has been arranged for a single correspondent to assemble and transmit "Notes" for C.P. News but it has been agreed in Australia that individuals submit material direct to the Editor. This suits our geography better.

Contributors should note that the last date for receipt of copy at the C.M.I. has had to be advanced to the first of the month prior to publication, i.e. 1st March, June, September and December.

- C.J. MAGEE,
C.M.I. Official Correspondent.

Department of Agriculture,
Sydney.